REMARKS

In accordance with the foregoing, the specification and claims 16-19 have been amended. No new matter has been added.

Claims 1-21 are pending and under consideration.

REJECTION UNDER 35 U.S.C. § 101

Claims 1-21 stand rejected under 35 U.S.C. § 101, with the Office Action indicating that the claims are directed towards non-statutory subject matter, and specifically as being directed to an abstract idea "without any specific limitation to a practical application."

Claim 1 at least recites:

> obtaining an optimum Trellis path among the considered Trellis paths and transmitting the optimum Trellis path.

Applicants respectfully submit that claim 1 at least recites a specific feature to a practical application in the claimed "transmitting the optimum Trellis path." Applicants submit that the practical application to a device of the method described in claim 1 must be made in order for the claimed "transmitting" to occur.

Claim 2 at least recites:

> selectively outputting a vector having a shorter Euclidian distance to the input LSF coefficient vector between the generated quantized first and second LSF coefficient vectors.

Applicants respectfully submit that claim 2 at least recites a specific feature to a practical application in the claimed "selectively outputting a vector..." Applicants submit that a practical application to a hardware device must occur in order for the claimed "selectively outputting" feature to be satisfied. Therefore, Applicants submit that claim 2 satisfies the requirements of 35 U.S.C. § 101.

Claim 8 at least recites a similar feature in differing scope and breadth, and therefore, for at least the reason presented above regarding claim 2, Applicants submit that claim 8 satisfies the requirements of 35 U.S.C. § 101.

Claim 20 at least recites:

> reducing memory size required for quantization and computation amount in a codebook search process

Applicants respectfully submit that claim 20 at least recites a specific feature to a practical application in the claimed "reducing memory size required." Applicants submit that a

practical application to a device, specifically "memory" must occur for the claimed feature "reducing memory size required," to be satisfied. Thus, Applicants submit that claim 20 satisfies the requirements of 35 U.S.C. § 101.

Therefore, Applicants submit that claims 1, 2, 8, and 20, and claims 3-7, 9-15, and 21, which depend therefrom, satisfy the requirements of 35 U.S.C. § 101.

Regarding claims 16-19, Applicants submit that claims 16-19 meet the M.P.E.P. guidelines for 35 U.S.C. § 101, with the claimed medium being directed to a structural embodiment, thus clarifying that the claimed medium is tangible. Further, para. [0083] of the Specification has been amended to reaffirm this scope.

Favorable reconsideration and a withdrawal of the rejection against claims 1-21 are respectfully requested.

REJECTION UNDER 35 U.S.C. § 102

Claims 1, 16, and 17 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Nikneshan et al. (Nikneshan) ("Soft Decision Decoding of a Fixed-rate Entropy-coded Trellis Quantizer over a Noisy Channel"). This rejection is respectfully traversed.

Claim 1 at least recites:

> constraining a number of initial states of Trellis paths available for selection, in a Trellis structure having a total of N ($N=2^v$, here v denotes the number of binary state variables in an encoder finite state machine) states, within 2^k ($0 \leq k \leq v$) of the total N states, and constraining the number of N states of a last stage within 2^{v-k} among the total of N states dependent on the initial states of Trellis paths;

The Office Action appears to be interpreting the above claimed features as being equal to the description in Nikneshan on pages 9-10, section 3, of a tail biting trellis structure where the start and end state on the trellis paths are the same. Nikneshan describes that μ bits are typically required to specify a starting state, and that the μ bits have a strong impact on the effective bit rate for small values of block length. Therefore, Nikneshan proposes using a tail biting structure, using the same start and end state on the trellis paths, to avoid sending the extra μ bits.

Applicants respectfully submit that in contrast to Nikneshan, wherein the start and end state on the trellis paths are the same one state, claim 1 recites "the number of N states of a last stage within 2^{v-k} ... dependent on the initial states of Trellis paths." Therefore, as Nikneshan merely describes that the number of ending states is only one and that this number of ending

states is fixed, does not vary, and is not dependent on anything else, Nikneshan fails to describe or suggest the claimed "a **number** of N states of a last stage" being "dependent on the initial **states** of the Trellis paths."

Accordingly, as claim 1 further at least recites:

> after referring to the **initial states** of N survivor paths determined under the initial state constraint from a first stage to a stage L-$\log_2 N$ (here, L denotes the number of the entire stages and N denotes the number of entire Trellis states), considering Trellis paths in which an allowed **state of the last stage is selected among 2^{v-k} states determined by each initial state** under the constraint on the state of a last stage by the constraining in remaining v stages

Here, the Trellis paths are considered "after referring to the initial states." As Nikneshan merely describes one start state, Applicants respectfully submit that Nikneshan does not describe "after referring to the initial states ... considering Trellis paths," as claimed.

Further, as Nikneshan describes merely one end state, which is the same as the start state, Applicants respectfully submit that Nikneshan does not describe "an allowed state of the last stage is selected among 2^{v-k} states determined by each initial state," as claimed.

Still further, as Nikneshan describes merely one start state, same as the end state, and thus fails to describe or suggest the claimed "considering Trellis paths in which an allowed state of the last stage is selected among 2^{v-k} states determined by each initial state," Applicants also submit that Nikneshan fails to describe or suggest the claimed "obtaining an optimum Trellis path among the considered Trellis paths and transmitting the optimum Trellis path." In contrast, Nikneshan describes searching through a tail biting trellis by running the Viterbi algorithm v times for different starting states (i.e. once for each different starting state as the starting state and the ending state is the same). Therefore, any optimum path determined in Nikneshan will not be from the "considered Trellis paths," as claimed, but rather will be from the searched tail biting trellis for each different stating state, with the ending state being the same.

Thus, in view of the above remarks, Applicants submit that Nikneshan fails to describe or suggest the features of claim 1.

Claim 16 recites features similar to claim 1 in differing breadth and scope. Therefore, for at least the reasons presented above regarding claim 1, Applicants submit that claim 16 and claim 17 which depends therefrom and recites patenably distinguishable features of their own, patentably distinguishes over the cited art.

Favorable reconsideration and a withdrawal of the rejection against claims 1 and 16-17 are respectfully requested.

REJECTION UNDER 35 U.S.C. § 103

Claims 2-15 and 18-21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Eriksson et al. (Eriksson) ("Interframe LSF Quantization for Noisy Channels"), in view of Erzin et al. (Erzin) ("Interframe Differential Vector Coding of Line Spectrum Frequencies") and further in view of Nikneshan. This rejection is respectfully traversed.

Claim 2 at least recites "removing a direct current (DC) component in an input LSF coefficient vector." The Office Action states that Eriksson does not disclose removing a direct current (DC) component in an input LSF coefficient vector, but contends that removing the DC component of a signal is a common technique used to simplify data processing by removing information from the signal, such as DC noise.

Applicants respectfully submit that the Office Action has used Official Notice in reaching the conclusion that "it would have been obvious to one of ordinary skill in the art at the time of the invention to remove the DC component in Eriksson, *since it would reduce the complexity of the system and help prevent quantization noise*" (emphasis added).

However, this is a conclusion by the Examiner not evidenced in the record, and is thus improper. In contrast, Applicants respectfully submit that the Office Action has not considered whether the modification of Eriksson to include the claimed "removing the DC component of a signal" may increase the complexity of the system by adding an extra component to perform such reduction. Further, the Office Action has not considered whether "removing the DC component of a signal," as proposed in the Office Action, would even be needed or desired in order to accomplish the objectives described in Eriksson.

Lastly, Applicants request at least a citation within Eriksson wherein support to modify Eriksson to include such a feature, is provided. See MPEP § 2144.

Further, Applicants respectfully submit that the claimed "removing a direct current (DC) component in an input LSF coefficient vector," cannot be equated to "removing the DC component of a signal." Thus, further, withdrawal of this taking of Official Notice is respectfully requested.

Claim 2 at least recites:

> generating a first prediction error vector by performing inter-frame

> and intra-frame prediction for the LSF coefficient vector, in which the DC component is removed , quantizing the first prediction error vector by using BC-TCQ algorithm, and then, by performing intra-frame and inter-frame prediction compensation, generating a quantized first LSF coefficient vector;

The Office Action cites to pages 501-505 of Eriksson as describing "generating a first prediction error vector." However, Eriksson merely describes a memory based vector quantizer (VQ), combined with a fixed memoryless VQ that operates independently of the memory based VQ. However, Eriksson is silent regarding the claimed "first prediction error vector by performing ... prediction for the LSF coefficient vector."

Similarly, Eriksson is silent regarding the claimed "second prediction error vector" as well as Eriksson is silent regarding any "prediction error vector."

Further, the Office Action on the top of page 8 states that Eriksson does not "disclose generating a first LSF coefficient vector by performing inter-frame prediction compensation and generating a second LSF coefficient by performing intra-frame prediction compensation," but states that "in any predictive vector quantizer the prediction value is added to the quantized prediction error," citing to FIG. 1, page 496 of Eriksson.

Applicants respectfully submit that claim 2 does not recite "generating a first LSF coefficient vector by performing inter-frame prediction compensation," as stated in the Office Action, but rather recites "by performing intra-frame and inter-frame prediction compensation, generating a quantized first LSF coefficient vector," thus, both "intra-frame and inter-frame prediction compensation" is recited in claim 2.

Applicants respectfully submit that Eriksson fails to describe or suggest the claimed "performing intra-frame and inter-frame prediction compensation, generating a quantized first LSF coefficient vector." Further, Applicants submit that the Office Action's statement that "in any predictive vector quantizer the prediction value is added to the quantized prediction error," cannot be applied to the claimed "performing intra-frame and inter-frame prediction compensation," as the predictive vector quantizer of Eriksson is based merely on inter-frame correlation. See Eriksson, page 495, column 2, last paragraph.

The Office Action states on page 7 that Eriksson "does not disclose quantizing the first prediction error vector and the second prediction error vector using BC-TCQ algorithm." However, the Office Action cites to Nikneshan on pages 9-10 as disclosing the use of a BC-TCQ algorithm for quantizing LSF parameters. Nikneshan describes merely a tail biting TCQ algorithm (TB-TCQ) and does not describe or suggest a "BC-TCQ." As the tail biting TCQ is

named as such for limiting the start and end state to be the same, thus avoiding the sending of μ extra bits, Applicants respectfully submit that the TB-TCQ cannot be equated to the BC-TCQ.

Still further, Nikneshan merely discloses using a TB-TCQ algorithm , but does not describe or suggest that the TB-TCQ algorithm is used to quantize "the first prediction error vector" and to quantize the "second prediction error vector," as claimed. Therefore, Applicants submit that the cited art fails to describe or suggest the claimed "BC-TCQ algorithm."

Applicants also respectfully direct attention to the differences between the TB-TCQ algorithm of Nikneshan and the claimed "BC-TCQ" algorithm described at least in the Specification in paras. [0033] and [0084]-[0087].

Therefore, in view of the above remarks, Applicants submit that the cited art fails to describe or suggest all of the features of claim 2. Thus, Applicants submit that claim 2 and claims 3-7 which depend therefrom and recite patentably distinctive features of their own, patentably distinguish over the cited art.

Claims 8, 18 and 20 at least recite features similar to claim 2 in differing scope and patentability. Therefore, for at least the reasons presented above regarding claim 2, Applicants submit that claims 8, 18 and 20, and claims 9-15, 19 and 21 which respectively depend therefrom and recite patentably distinctive features of their own, also patentably distinguish over the cited art.

Favorable reconsideration and a withdrawal of the rejection against claims 2-15, 18-21 and 20 are respectfully requested.

CONCLUSION

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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